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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,028	07/29/2003	Ge Yi	S01.12-0988/STL 11281.00	7629
27365	7590	03/14/2006	EXAMINER TUGBANG, ANTHONY D	
SEAGATE TECHNOLOGY LLC C/O WESTMAN CHAMPLIN & KELLY, P.A. SUITE 1400 - INTERNATIONAL CENTRE 900 SECOND AVENUE SOUTH MINNEAPOLIS, MN 55402-3319			ART UNIT 3729	

DATE MAILED: 03/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

SP

Office Action Summary	Application No.	Applicant(s)	
	10/629,028	YI ET AL.	
	Examiner	Art Unit	
	A. Dexter Tugbang	3729	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 19-36 is/are pending in the application.
- 4a) Of the above claim(s) 2-6, 20-23 and 25-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 7, 8, 19, 24 and 31-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7/29/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of the invention of Group I-D, Claims 7, 8, 24 and 31-36 in the reply filed on December 15, 2005 is acknowledged. The traversal is on the ground(s) that each subcombination defined is not separately usable. This is not found persuasive because utility is defined by the scope of the claimed invention, which in this case, is directed to a process of making a particular product (e.g. magnetoresistive sensor). Each Group has separate utility, which is a separately usable process to make the product. For example in Group I-D, the separately usable process is the step of ion implanting, which is neither recited, nor required in any of Groups I-A through I-C. Since Group has separate and distinct lines of patentability and being that linking Claims 1 and 19 are held to be unpatentable, the requirement is still deemed proper and is therefore made FINAL.

2. Claims 2-6, 20-23 and 25-30 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on December 15, 2005.

Specification

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: --A Method of Manufacturing a Magnetoresistive Sensor--.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 7, 8, 19, 24, 31-34 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Knapp et al 6,417,999, Tao et al 6,737,286, and Segar et al 6,368,425.

Regarding Claim(s) 1, 19 and 31, Knapp discloses a method of forming an MR sensor comprising: forming a first magnetic lead (e.g. 230 to the left of gap 241) of magnetic and electrically conductive material; forming a second magnetic lead (e.g. 230 to the right of gap 241, see Fig. 2e) of magnetic and electrically conductive material; and forming a junction (free layer 253) between the first and second magnetic leads (see Fig. 2f and 2g), the junction formed of a magnetic and electrically conductive material (col. 9, lines 1-6) and forms an electrically conductive junction core with an outer shell (e.g. outer surface area)

Knapp does not teach forming a constricted junction that includes implanting ions of a non-ferromagnetic element into the outer shell.

Tao teaches that a constricted junction can be formed by implanting ions onto an outer shell portion of the core (region between leads 70 in Fig. 9) for the purpose of substantially bridging the first and second magnetic leads (col. 10, lines 1-3).

Segar shows that magnetic leads that are formed as a junction in general, can by ion implanted with non-ferromagnetic elements of boron or chromium for the advantage of improving magnetic properties (see Fig. 4 and col. 5, lines 35-56).

NOTE: With respect to the limitations of “reducing the magnetic and electrical conductivity of an outer shell portion of the junction” (lines 10-11 of Claim 1 with similar limitations in each of Claims 19 and 32), these limitations are inherently met by Tao and Segar to the extent that the Segar utilizes the very same material (e.g. boron or chromium) as the applicant(s) and Tao utilizes other non-ferromagnetic elemental materials, both of which would achieve the properties of reducing the magnetic and electrical conductivity of an outer shell portion of the junction.

Regarding Claim(s) 34, Knapp shows the first magnetic lead, the second magnetic lead and the junction (in Fig. 2g) to be coplanar.

Regarding Claim(s) 36, Knapp further shows (in Fig. 2g) a length (e.g. distance between leads 20, 224 at the bottom of gap 241) of the junction core to be less than an average unrestricted magnetic domain wall width (distance between leads 230 at the top of gap 241) of the magnetic material of the junction core.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Knapp by including the ion planting process of both Tao and Segar, for the associated advantages of improving magnetic properties and bridging the first and second magnetic leads in manufacturing the MR sensor.

6. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art above as applied to claim 31 above, and further in view of Mao et al 6,411,478.

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Knapp, as modified by Tao and Segar, discloses the claimed manufacturing method as relied upon above. The modified Knapp method does not teach that the first and second magnetic leads and the junction can be formed of a single layer of magnetic and electrically conductive material.

Mao teaches that a first magnetic lead (e.g. 325), a second magnetic lead (e.g. 326) and a junction (e.g. 330) can be formed as a single layer of magnetic and electrically conductive material within the same plane (e.g. Fig. 3 plane defined by 315, 320) to produce an art recognized equivalent MR sensor.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of the prior art by forming the first magnetic lead, second magnetic lead and junction as a single layer, as taught by Mao, to positively product an art recognized equivalent MR sensor.

Conclusion

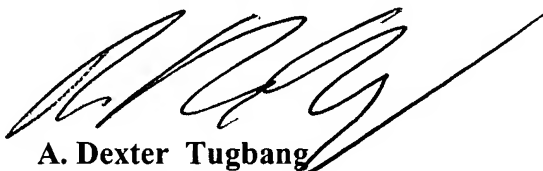
7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Dexter Tugbang whose telephone number is 571-272-4570. The examiner can normally be reached on Monday - Friday 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 571-272-4690. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



A. Dexter Tugbang
Primary Examiner
Art Unit 3729

March 6, 2006